

# **The Geography of Innovation and Entrepreneurship**

**Innovative Entrepreneurship and Public Policy**

6 June, 2006 / Rueschlikon

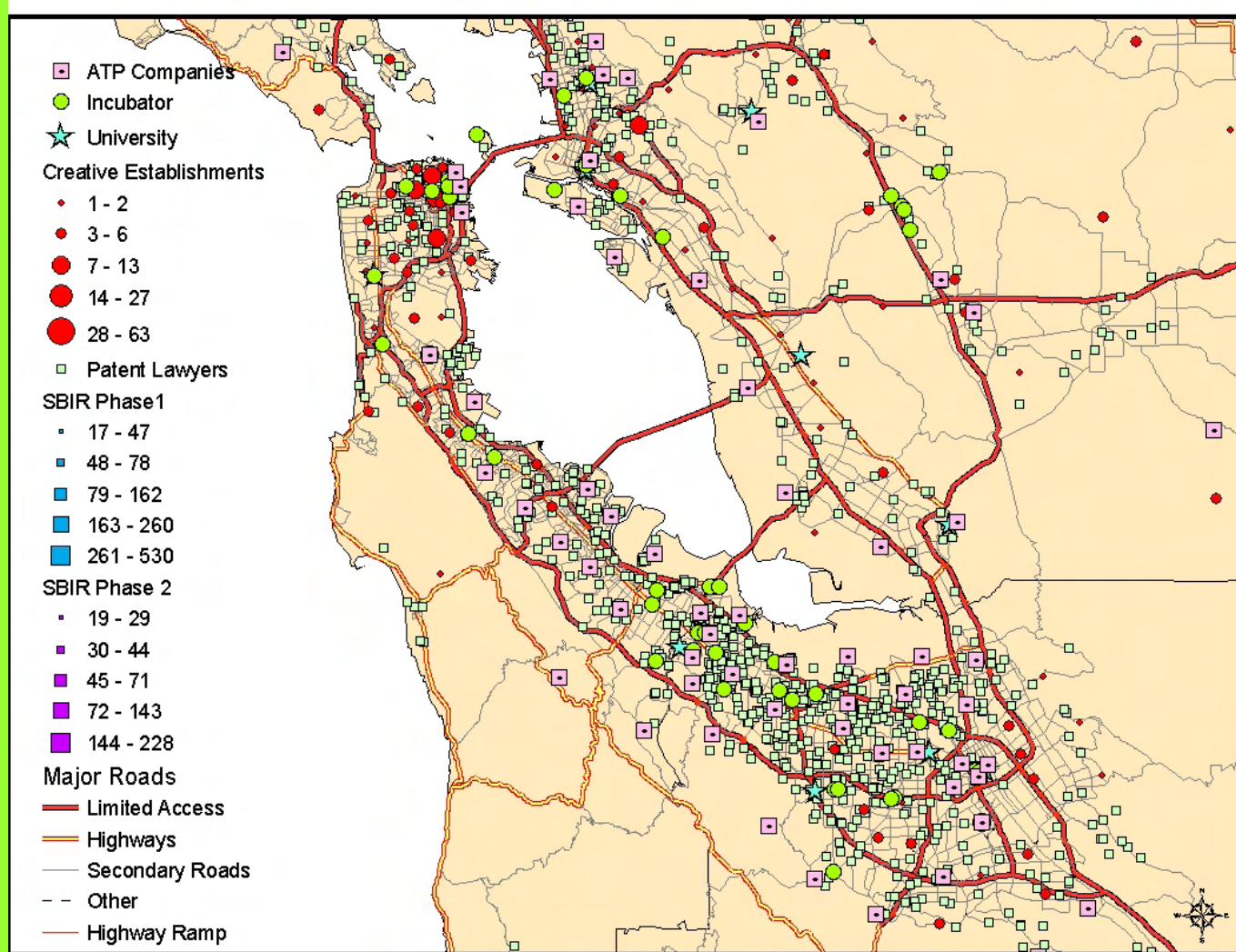
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## Order Statistics?

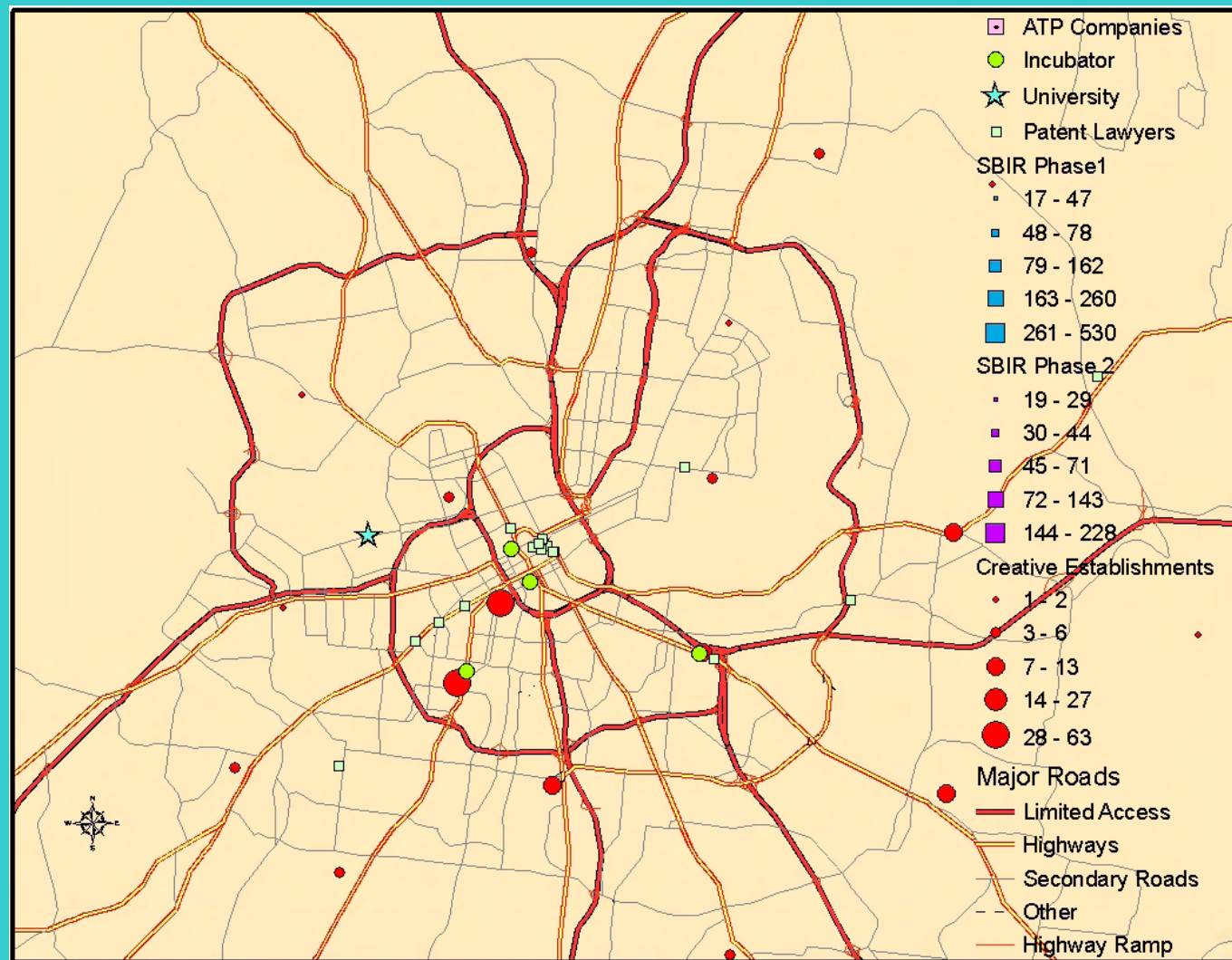


**San Francisco Bay (CA) area, by zip code: ATP award-recipient firms, SBIR award-recipient firms, universities, intensity of patent lawyers, and “creative establishments”.**



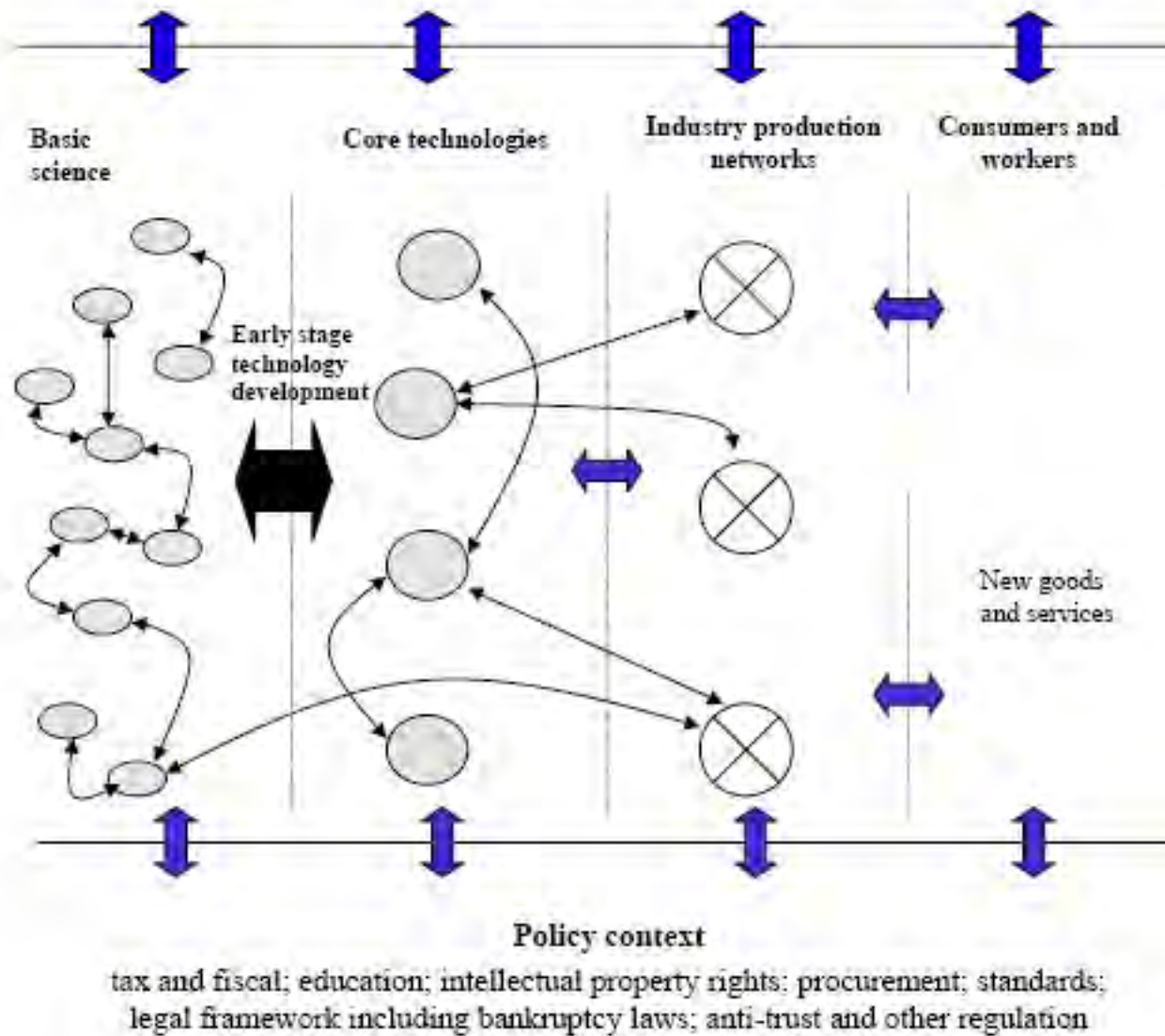


**Nashville (TN) area, by zip code: ATP award-recipient firms, SBIR award-recipient firms, universities, intensity of patent lawyers, and “creative establishments”.**

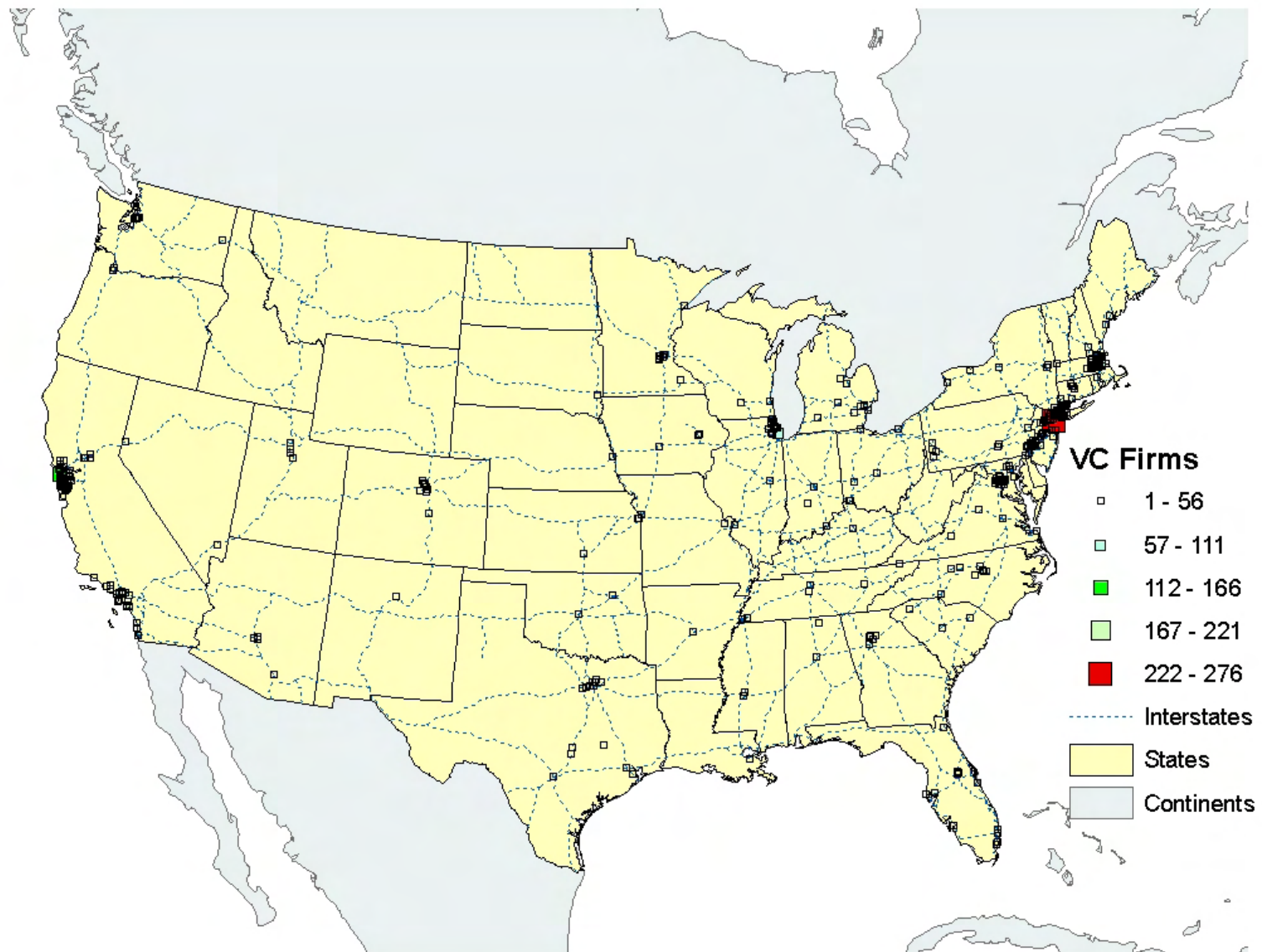


### Economic context and “intangibles”

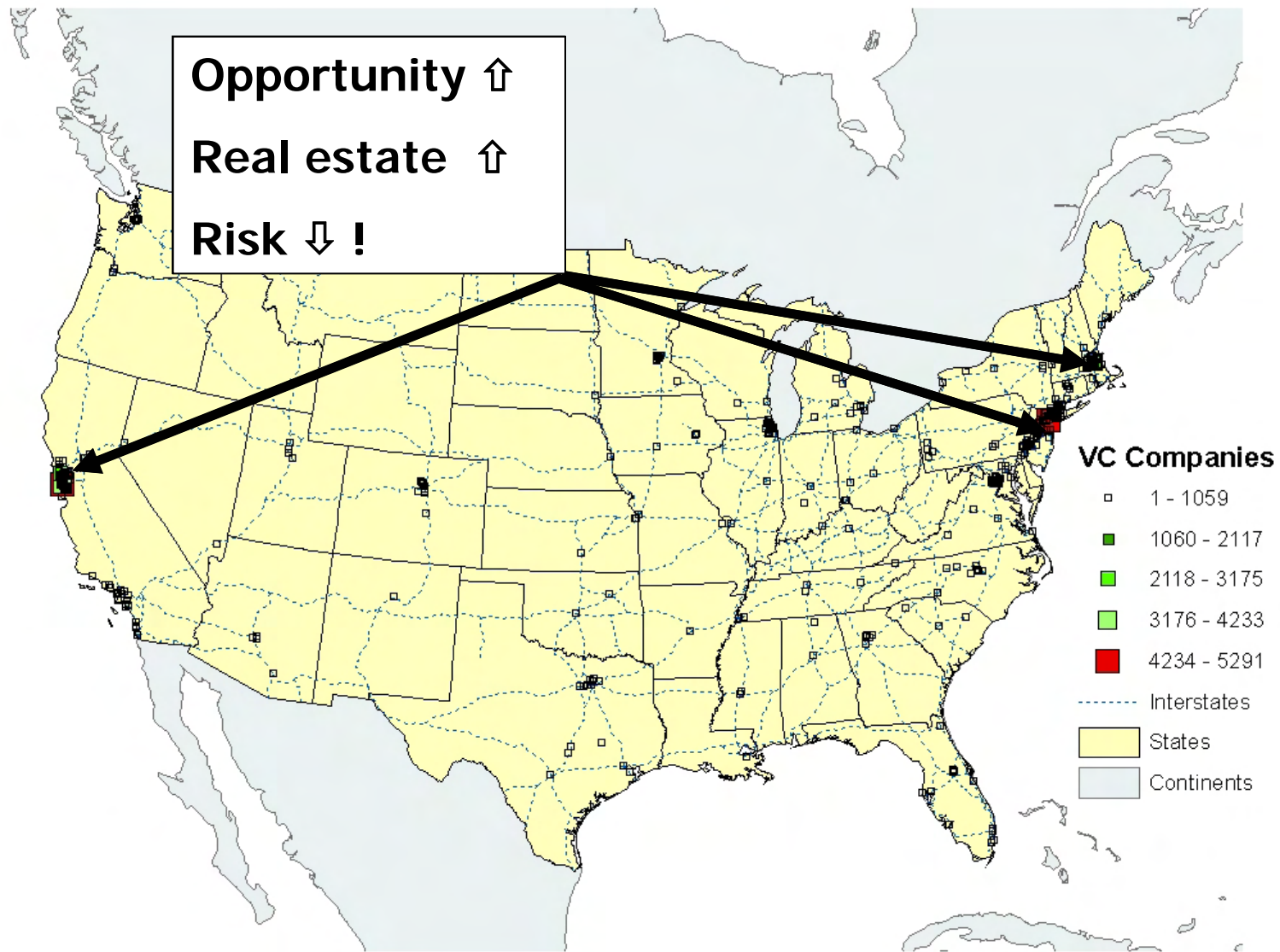
macroeconomic conditions including output and employment; knowledge base; communications and other infrastructure; consumer confidence and preferences; strength of institutions; culture



## Venture capital firms

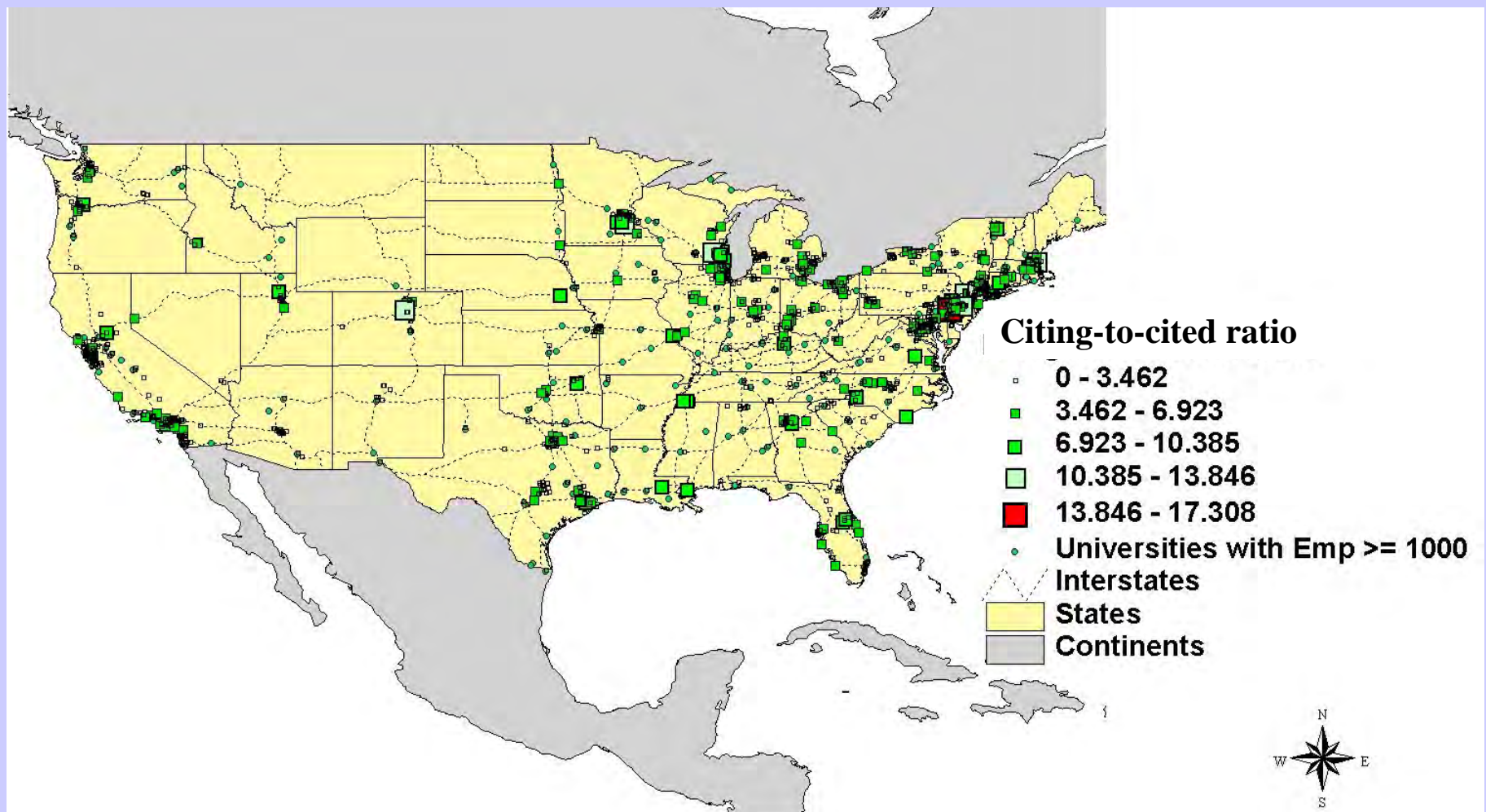


## Venture capital recipient companies





## Emerging technology regions, identified by the ratio of citing to-cited patents (both defined by 2002 cohort), by cities





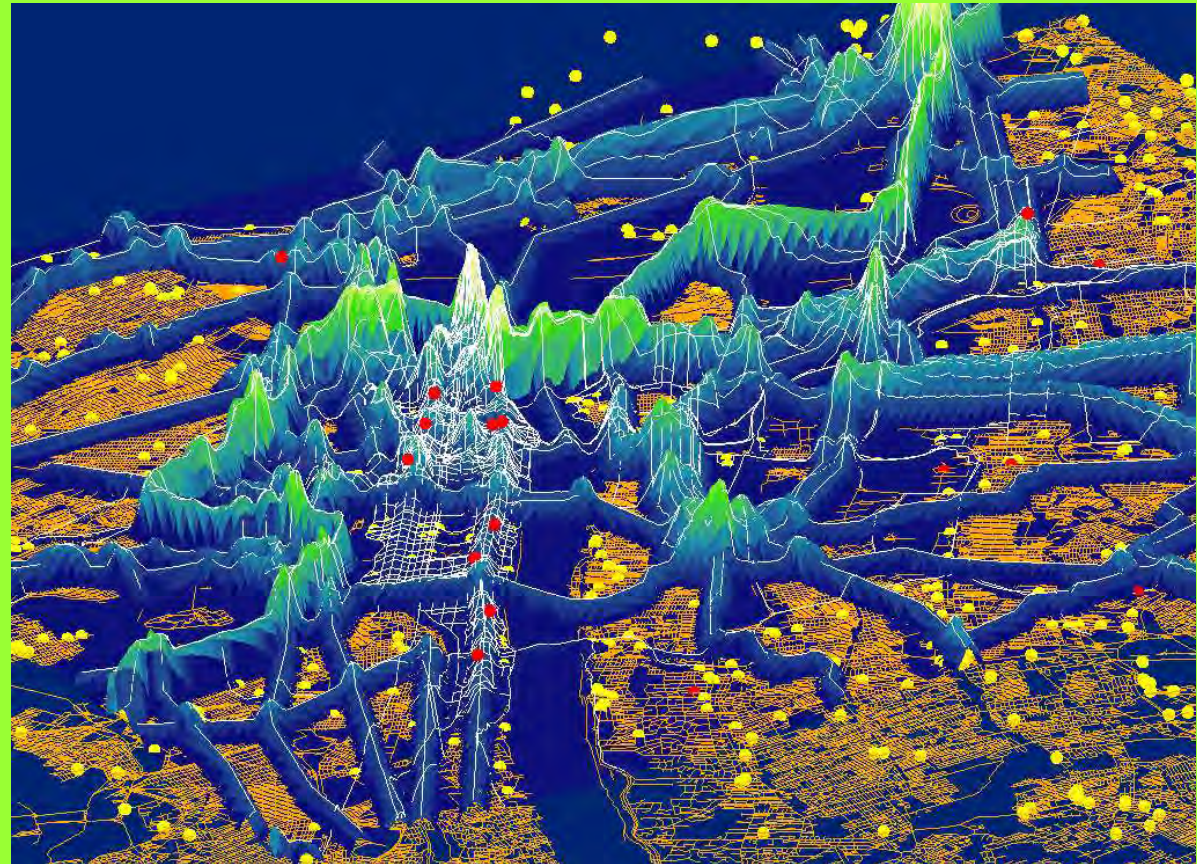
# *Creating a thriving culture of technology entrepreneurship*

## *Method 1*

### **Build infrastructure.**

Fiber optic cable,  
ATP award  
winners, and  
R&D laboratories,  
New York  
metropolitan  
area.

*Data sources:*  
GMU project on  
critical  
infrastructure  
mapping, ESRI  
Business Analyst.



*Creating a thriving culture of technology entrepreneurship:  
Method 2*

- 1. Spend large sums of government money on defense related R&D.**
- 2. Stop spending.**
- 3. Wait.**

Success stories from method 1: Silicon Valley, San Diego, Northern Virginia, Israel.

*Creating a thriving culture of technology entrepreneurship:*

*Method 3*

**Let the governments of India and Taiwan pay to train your skilled workers.**

Success story for method 2: the USA (in question after 9/11?)

Policy recommendation for the Commonwealth of Massachusetts:  
Build Indian cultural centers (particularly in Central and Western Massachusetts)

*Creating a thriving culture of technology entrepreneurship:*

*Method 4*

**Permit theft of trade secrets and risky management of pension funds.**

*Success story for method 3:* California (trade secret law); U.S. (changes w.r.t. ERISA)



*Creating a thriving culture of technology entrepreneurship*

*Method 5*

**Succeed.**

The power of the demonstration effect.)

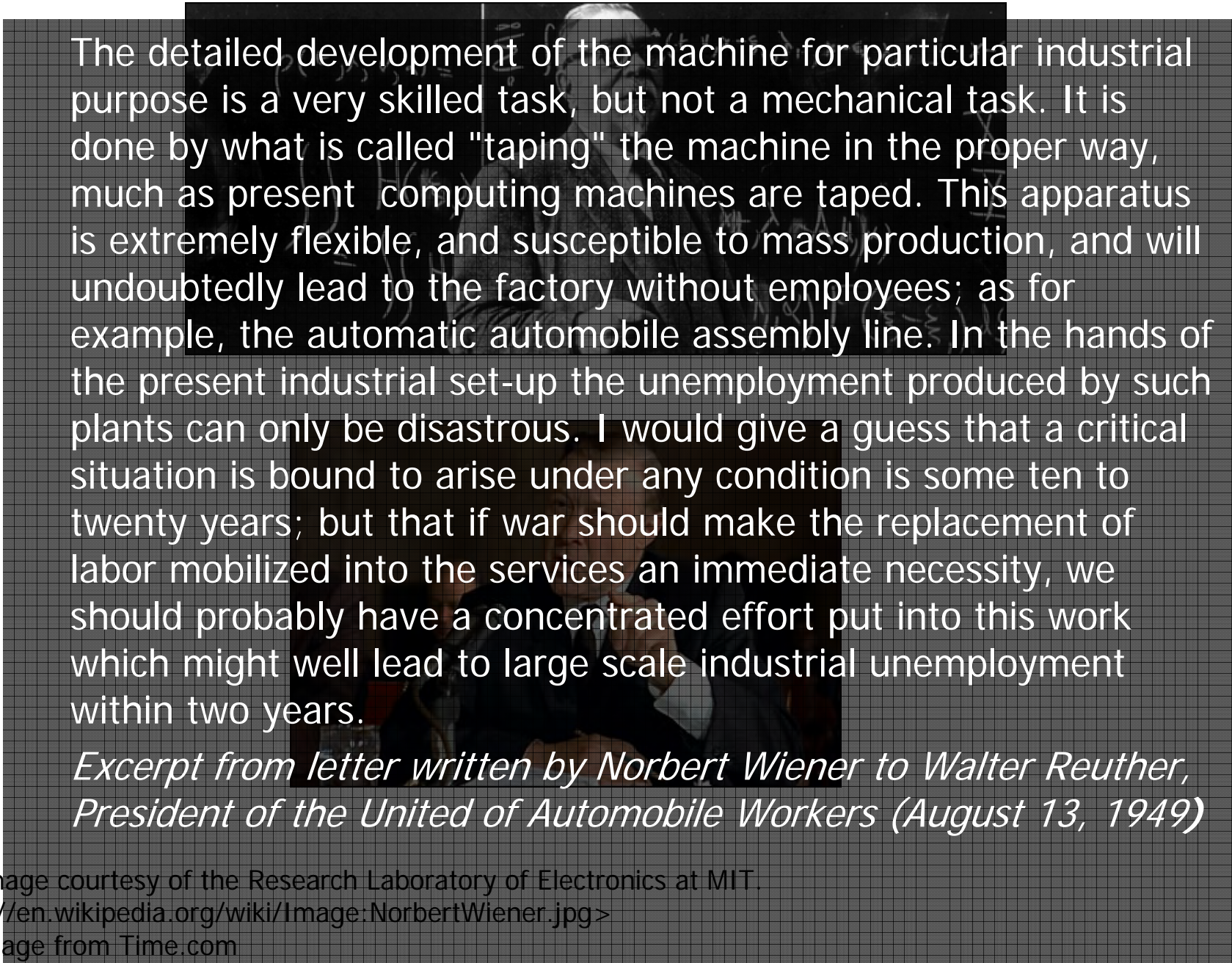
**Successful entrepreneurs become mentors—the critical role of business angels.**

“Show me the money?” No.

**Show me the *mentors*.**

END

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The detailed development of the machine for particular industrial purpose is a very skilled task, but not a mechanical task. It is done by what is called "taping" the machine in the proper way, much as present computing machines are taped. This apparatus is extremely flexible, and susceptible to mass production, and will undoubtedly lead to the factory without employees; as for example, the automatic automobile assembly line. In the hands of the present industrial set-up the unemployment produced by such plants can only be disastrous. I would give a guess that a critical situation is bound to arise under any condition is some ten to twenty years; but that if war should make the replacement of labor mobilized into the services an immediate necessity, we should probably have a concentrated effort put into this work which might well lead to large scale industrial unemployment within two years.

*Excerpt from letter written by Norbert Wiener to Walter Reuther, President of the United of Automobile Workers (August 13, 1949)*

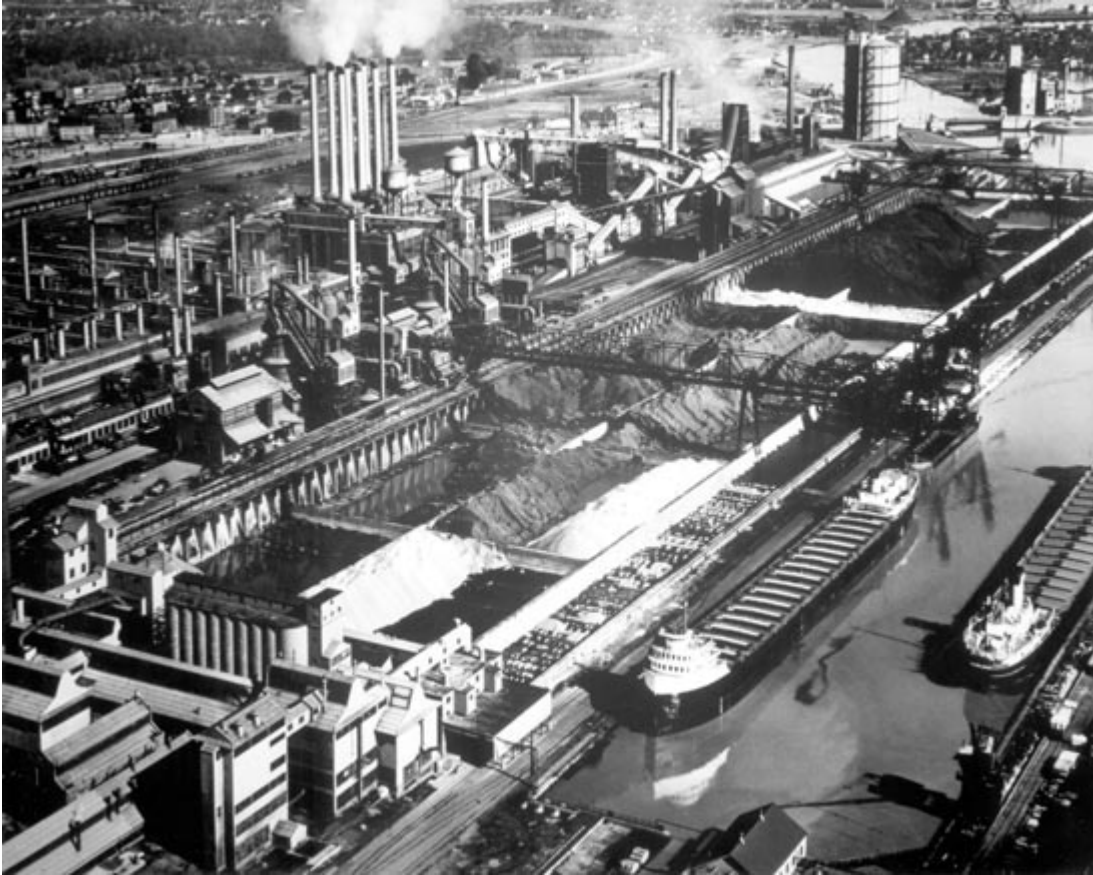
Top Image courtesy of the Research Laboratory of Electronics at MIT.

<<http://en.wikipedia.org/wiki/Image:NorbertWiener.jpg>>

Top image from Time.com

<<http://www.time.com/time/time100/builder/profile/reuther.html>>



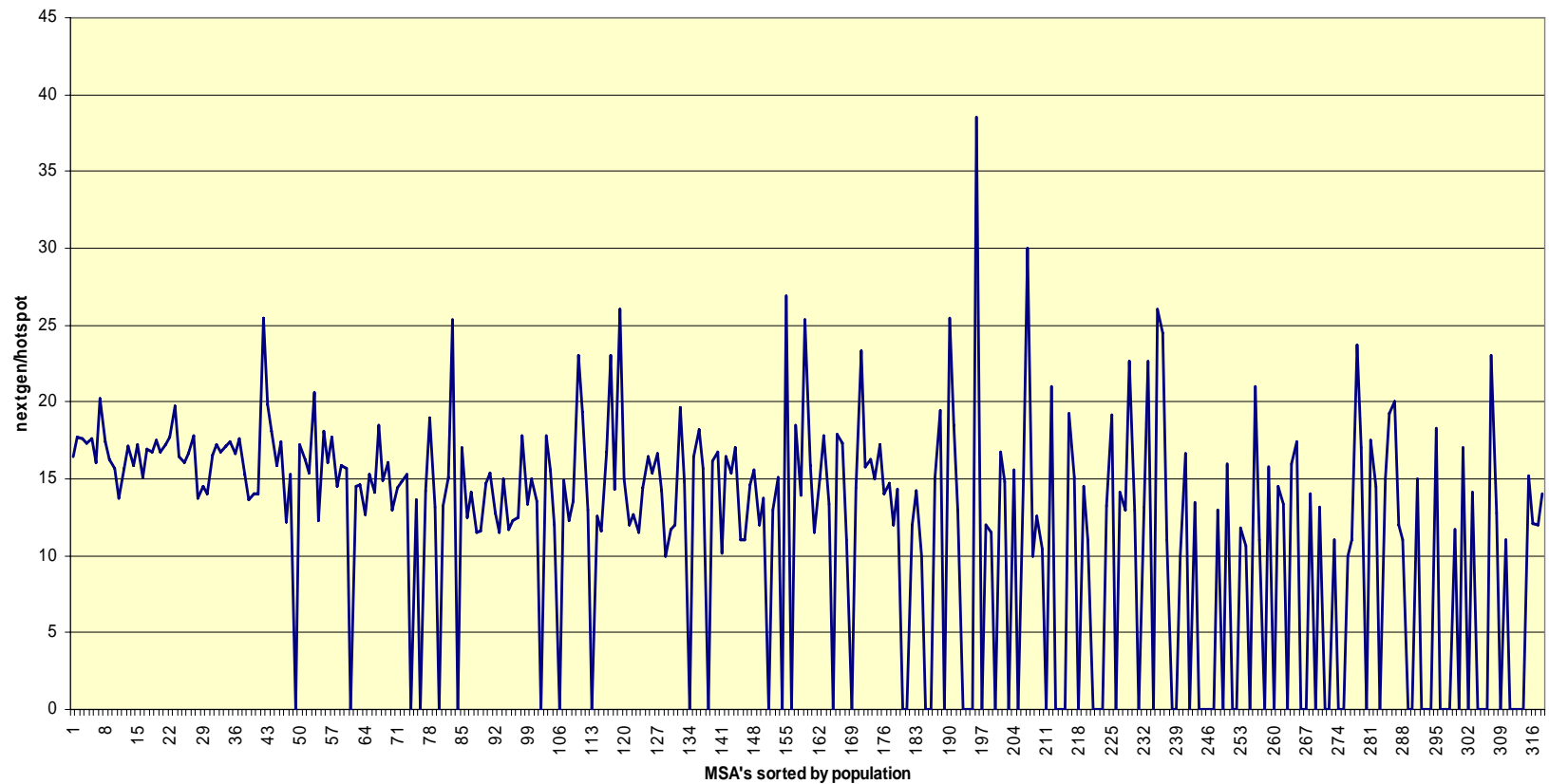


*If* Soviet industry is accurately described by the aggregate production function [as given], *if* the parameter values have been accurately identified, and *if* they do not change very much in the near future, then it would seem that a strategy of strong capital accumulation must be considerably less successful for the present relatively mature Soviet economy than for its labor surplus predecessor...

- [T]here has always been a suspicion that Soviet emphasis on yearly, quarterly, and monthly plan fulfillment leads to a fear of uncertainty which has discouraged innovation at the local level. Does this mean that a greater degree of autonomy on issues related to innovation and risk taking would help increase growth in the residual?"

**Martin Weitzman (1970)**

**Citing-to-cited patent ratios by MSAs, ranked from left to right in order of increasing population.**



## Invention to Innovation Transition: U.S.

Relationship of new firm creation to technology creation (1998):

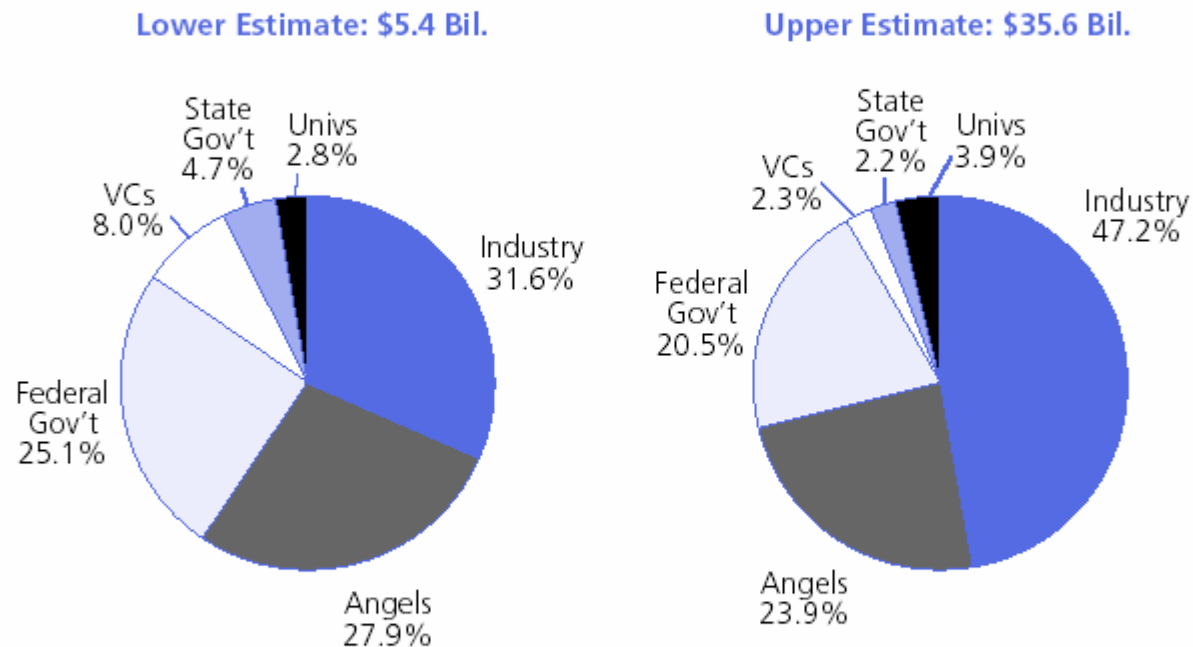
- 628,900 new firms with employees were created (U.S. Small Business Administration data)
- ~20,000 start ups received ~\$20 billion in funding from Angel investors (J. Sohl estimate)
- ~300 companies received seed funding from VCs, approximately 10% of total (PricewaterhouseCoopers)
- ~260 university spin-offs created from university license or IP. (U.S. Association of University Technology Managers; number now about 400)

*Who funds technology early stage technology development?*



# Invention to Innovation Transition: U.S.

**FIGURE 1. Estimated distribution of funding sources for early-stage technology development, based on restrictive and inclusive criteria**



Note: The proportional distribution across the main funding sources for early-stage technology development is similar regardless of the use of restrictive or inclusive definitional criteria.

From Branscomb and Auerswald (2002)  
[www.fundinggap.org](http://www.fundinggap.org)

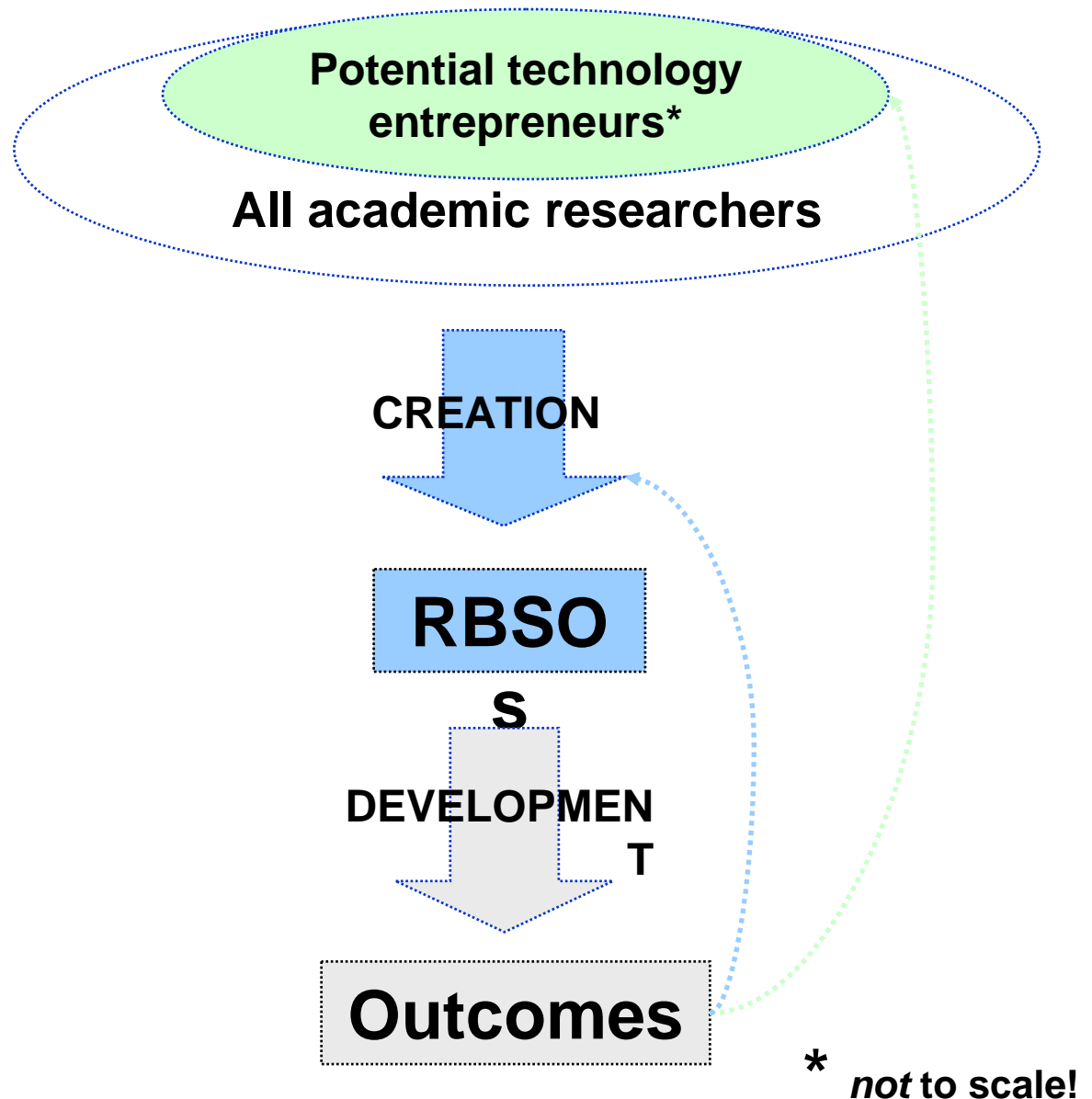
# Drivers

- behavioral types
- presence of mentors / demonstration effect
- university policies (hiring, IP, salary, tenure)
- type and quality of research

- financing (SBIR, own funds, corporate, in-kind... but not VC)
- valuation and other contracting challenges (why create a new firm?)
- immediate presence of customers

- presence of complementary infrastructure (facilities, suppliers, lawyers)
- presence competing and complementary firms

# Process



## Two comments on framing

### **Corporate spin-offs**

- Research-based spin-offs from corporations at least as important as those from Universities?
- U.S. numbers:
  - Companies created annually out of university-licensed IP: ~600
  - Total number of small technology companies in the U.S.: 20,000

For U.S. data, we don't know where most small technology companies originate.

### **Relocation**

- Why is U.S. K-12 still so bad? Because
  - Innovation and growth driven by outliers, and
  - For the last 50 years (350?) the U.S. has been able to depend on imported talent.
  - Within the U.S. or outside, best people (and companies) don't stay put.